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Chapter 5**There's more to thinking than the intellect**

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Abstract

Emotions tend to be ignored when exercising thought. This chapter illustrates the interaction of moods and emotions with the purposeful thought commonly expected in the classroom. Often, moods and emotions are seen simply as impediments to thought but they also drive, shape and support it. This needs to be more widely recognized in the fostering of thinking processes.

Introduction

Thought and action frequently bear the mark of emotion, something which is accepted in everyday life: marriage, employment, pastimes, attire, are generally shaped as much by emotion as by reason, and writers make a living from the interaction (Oatley, 2002). But, in the classroom, emotion is seen as sand in the works, an impediment to clear thinking, an unwelcome distraction, and something to be suppressed or ignored (e.g. Phelps, 2006). Assumptions like these are passed from one generation of teachers to the next but Neumann (2012, p. 8) has pointed out that, 'the systematic exploration and analysis of selected aspects of our world relies on feeling [as much as] thinking, knowing, and learning'. Moreover, this exploration can be better for it. Lehrer (2009, p. 20) goes further: 'If it weren't for our emotions, reason wouldn't exist at all.' The brain's emotional and intellectual systems are highly connected and communicate continually to promote what we believe are our best interests. Sometimes the partnership is harmonious, and sometimes it is not (Sylvester, 1994).

The interaction between the intellect and emotions varies: at one extreme, the intellect may be the principal player (in what Immordino-Yang and Damasio (2007) have called High Reason); at the other, emotions dominate. Most thought is somewhere in between but this is not to say that it is irrational or that irrationality is acceptable (Fried, 2011). We have two systems looking after our interests. The emotional system is older, involuntarily and fast while the intellectual or cognitive system is younger, voluntary and relatively slow (e.g. Hanze, 2003). In his concern for fostering thinking, Dewey recognized that a sharp division between the intellect and the emotions was unhelpful, particularly when it ignored emotion's contribution to motivation (Dewey, 1938/1998). Motivation is, however, only a part of the picture: moods and emotions in the classroom also shape the nature and products of the intellect's efforts. In spite of this, educationalists often confine their attention to the intellect.

The emotional system

The emotional system automatically appraises situations and notes what it perceives to be of personal consequence. What is of consequence depends on personal needs, values, beliefs and goals, some of which form in childhood and may not be entirely

conscious (Freeman, 2000). If such consequences are detected, the system prompts a response (Clore & Huntsinger, 2007). This fast emotional appraisal and response system, often accompanied by a feeling, has survival value (Tooby & Cosmides, 1990). Schwartz's (1994) found two dimensions in people's values, one concerned with achievement, power, and benevolence and another reflecting a need for stimulation, self-direction and security. Furthermore, these dimensions were almost universal. Where students lie on the dimensions depends on their needs, values, beliefs and goals and on the priority afforded them. Students also have tendencies in how strongly they respond and how well they cope. In addition, how emotions are perceived and expressed depend on cultural norms. For instance, there is a greater readiness to express emotions in 'individualistic' societies like the USA and Australia than in 'collectivist' societies like China. There are also particular differences. For example, in the former, it is acceptable to express pride but not guilt while in the latter, the converse is true. At the same time, a given society usually comprises several sub-cultures, each with its own acceptable emotional behaviours (Eid & Diener, 2001; Elfenbein & Ambady, 2003; Matsumoto, Yoo and Fontaine, 2008).

A distinction is usually made between moods and emotions. Emotions are generally short-lived responses aroused by specifics, such as a task, a teacher's action, or a student's behaviour. Moods, however, are generally longer-lasting and more diffuse. They are the emotional system's response to perceptions of the current state of well-being. For instance, a student who perceives her lot to be unremitting humiliation is unlikely to feel good about it and may take this enduring feeling from lesson to lesson. As moods and emotions change, however, people are subject to a varying stream of affect (e.g. Vandekerckhove & Panskepp, 2009). Very long-lasting affective states, extending over months or years, may be described as dispositions. Dispositions can bear in consistent ways upon cognition (Oatley & Jenkins, 1996).

Moods and emotions are grouped in various ways. Frequently, they are classified as of positive or negative hedonic tone, according to whether they feel pleasant (e.g. contentment, joy) or disagreeable (e.g. sadness, sorrow) (Diener & Lucas, 2000). They may also be activating (e.g. joy, anger) or deactivating (e.g. sadness, contentment). A third way is to label them as approach-inducing (e.g. happiness, mild frustration) or avoidance-inducing (e.g. contentment, anxiety). On this basis, rage can be negative, activating and approach-inducing (Baas, De Dreu, and Nijstad, 2008). In practice, classifying moods and emotions like this is not always easy. Anger, for instance, is activating, it prompts approach but some are equivocal about its hedonic tone. As a consequence, some prefer to refer to particular moods and emotions and their specific effects. Nevertheless, grouping emotions according to hedonic tone, activation-deactivation and approach-avoidance, or even just one of these, usefully simplifies thought about the emotion-cognition space provided that the simplification is recognized.

Some also refer to 'academic' emotions although it is unlikely that any emotion is unique to the classroom. The term may be construed to refer to common emotional responses to particular kinds of classroom events. For instance, there may be anticipation or anxiety generated by a particular activity, enjoyment or boredom in engagement with it, pride or disappointment in its completion, and admiration for or jealousy of others during the event. Thought, then, can amount to demanding

emotional labour in which emotions ‘profoundly affect’ engagement, performance and success (Pekrun & Linnenbrink-Garcia, 2012, p. 259).

The intellectual system

The intellectual system is, in evolutionary terms, the younger system. It is relatively voluntary, more open to reflection, often effortful and slow, and is more limited in capacity. Under pressure, there can be a tendency to default to the emotional system for an answer. The intellectual system is what teachers hope to activate and the philosopher, Peirce, pointed out that this activation has purpose (Poggiani, 2012). Commonly expected in programmes of study or promoted by educationalists, purposeful academic thought is aimed at, for instance, the exercising of deduction, causal understanding, creative thinking, decision making, and critical thinking (Newton, 2014a).

Deduction

Here, deduction refers to logical inferencing which produces a consequence or conclusion from given premises or conditions in what could be formulated as an, ‘If this, then this follows’, sequence (Colman, 2003). Putting aside interactions with emotions, human deduction is not infallible because the intellectual system has limited capacity and people are inclined towards an economy of mental effort (Johnson-Laird, 2010).

Casual understanding

Understanding is the construction of meaningful, coherent wholes by inferring patterns and relationships within information and with prior knowledge. Causal understanding, inferring the relationship of cause and effect which enables the explanation of situations and events, is highly valued (Piaget, 1978) and teachers are widely urged to teach for understanding (e.g. Perkins & Blythe, 1994). The word ‘cause’ may not always meet with approval; it is common in science where it explains the certain effects of natural laws but, when the same word is used in history, it refers to antecedent conditions from which events plausibly, but not inexorably, follow (Newton, 2012).

Creative thinking

Creative thinking refers to the construction of alternative worlds which includes constructing tentative explanations of events. Whereas causal understanding is the construction of cause-effect relationships which are commonly accepted in the academic community, a student’s creative thinking is expected to suggest plausible relationships which are at least novel to the student and where the teacher’s support is relatively limited (Newton, 2010a). Peirce called the construction of plausible hypotheses or tentative explanations, abductive inferencing (Peirce, 1923/1998). In some disciplines, creative thinking is usually called problem solving.

Decision making

Decision making (as practical wisdom or thinking for action) has also attracted some attention (e.g. Baltes & Staudinger, 2000; Maxwell, 1984; Sternberg, 2001). It requires the construction of comprehensive understandings, courses of action to achieve particular ends, and the weighing of likely consequences in order to select an acceptable act (Baltes & Smith, 2008; Ryan, 1999). Often entailing a balancing of self-interest and the interests of others, it involves values, and moral and ethical

deliberation. Recognizing that such thought can be demanding, Labouvie-Vief (1990) called it 'post-formal'.

Critical thinking

There are various views of critical thinking but, here, its purpose is taken to be the evaluation of thought to improve or judge its credibility (Moseley, Baumfield, Elliott, Gregson, Miller, and Newton, 2005; Newton, 2014a). It can involve interpreting, reconstructing, analyzing and judging what it appraises. Like other kinds of purposeful thought, it is not infallible and is open to bias (Newton, 2010b; Thayer-Bacon, 1998).

Various strategies are known to support these kinds of thought. For example, questions can initiate particular kinds of processing (Newton, 2012), dialogue in communities of enquiry has the potential to help students see other perspectives (Wegerif, 2006), and collaboration between students can foster critical thinking (Gokhale, 1995).

These thinking constructs are familiar terms in education but they are neither single processes nor mutually exclusive. Any of them may call upon, for instance, deduction or understanding. Instead, each is distinguished by its overall purpose and the essential presence of thinking processes which satisfy that purpose. Accordingly, causal understanding and creative thinking will be used to represent thought which needs to be broad and constructive; deduction and critical thinking are used to illustrate thought which needs to be focused and systematic. Decision making will be used as an instance of thought in which emotions can be essential. But first, there is a need to describe a clear emotional effect which prompts someone to engage in purposeful thought.

Emotion-cognition interaction

Motivation and engagement

Beginning with Dewey's concern, the role of emotions in motivation, this is an obvious place where emotions make a difference: more than that, they determine whether there will even be relevant, purposeful thought. If a task appears to offer some satisfaction of personal needs (such as novelty, competence, a predictable world, affiliation) or supports a goal (such as progress towards a particular career), a student is likely to be motivated to engage with it. The possibility generates interest which prompts approach, engagement and effort (Pekrun, Goetz, Titz, and Perry, 2002). And, of course, there are those who are motivated by a desire to avoid disagreeable consequences. Accordingly, the emotional system can generate a state of mind which inclines students to engage with or reject academic, purposeful thought (e.g. Newton, 1988; 2012). Mestre (2005) called approaches which exploit emotions in this way, pedagogies of engagement. An effective pedagogy of engagement involves the consideration of instructional and relational matters. Tasks are designed to have personal consequence and produce a satisfying success. The teacher shows enthusiasm, and provides an emotionally secure environment (Darby, 2005; Olitsky, 2007). Enthusiasm is contagious; it attracts students to tasks to see what might be in it for them. An emotionally secure environment is one where students feel their thoughts, successful or not, are valued. The role of emotions in student motivation is manifest and has not been overlooked. Enthusiastic teachers are preferred and there is

a widespread belief that learning should be enjoyable (e.g. Berlach & McNaught, 2007; Cheng & Mok, 2008; Newton & Newton, 2001).

Once engaged, emotions provide feedback about the progress of thought. When it seems to be productive, feelings of pleasure and satisfaction maintain it; in effect, the emotions provide a green light and motivate continuation. If thought founders, feelings of frustration and impatience are a red light signalling a need for a change of approach (Isbell, Lair, and Rovenpor, 2013). In this way, emotions do more than simply attract someone to a task and encourage engagement. They also maintain and redirect lines of thought. But the kind of thought itself is also open to emotions.

Broad, constructive thinking

Constructive thinking requires, at least, attention, recall of relevant prior knowledge and an inferring of relationships (Yekovich, Thompson, and Walker, 1991). As the mind's processing capacity is limited, a mental state which applies resources in a selective and sustained way, directing attention to what seems potentially significant, determines what patterns and relationships will be noticed. Matters which seem of personal consequence are particularly likely to attract attention until they prove otherwise. Attention can also be directed by moods and emotions brought to a task. For example, a sad mood can act like a filter which predisposes people to notice sad faces and gloomy language (Becker & Leinenger, 2011; Howe & Malone, 2011). On the other hand, happy students tend to see the bigger picture and are more ready to generalize while sad students focus on the details and particularize (Fredrickson & Branigan, 2005). This directing of attention determines what information is active in the student's mind and, hence, which connections are made.

To recall something presupposes that it has already been stored in memory. Events which generate strong emotions are rarely forgotten; they are potentially of great personal consequence so storing them could be advantageous. This includes, for example, the events which produce embarrassment, regret or shame (Armony, Chochol, Fecteau, and Belin, 2007; Phelps, 2006). Nevertheless, the mind's recall of such information is not always accurate; there is a tendency to inflate the emotion and the significance of the event, especially when the emotion was negative (Miron-Shatz, Stone, and Kahneman, 2009). At the same time, recall can be deceived by moods: a 'good' mood inclines students to believe they have already studied something while a 'bad' mood makes them more likely to deny it (Sergeier, Lepage, & Armony, 2007). In short, what students recall is partly determined by emotions and moods both at the time of storing the information and at the time of recalling it.

Positive moods and emotions tell the student that the situation is safe and open to 'broaden and build thinking'. This favours causal inferencing which enables explanation (e.g. Clore & Palmer, 2009). When an understanding is slow to develop, those who begin in a positive mood are also more inclined to cast their net wider and supplement their information, possibly in an unconscious attempt to preserve their agreeable mood (Gasper & Zawadzki, 2012). More broadly, in narratives about people, empathy with the characters leads students to adopt their goals and construct causal explanations of events and behaviours (e.g. Bourg, Ridsen, Thompson, and Davis, 1993). Emotive material in general tends to be processed more deeply and this may be why there is more causal inferencing about the characters. It is not unusual for students to arrive with understandings they have constructed elsewhere. At times,

these are deficient or do not accord with generally accepted understandings which have to be taught. The students' receptivity can depend on their mood and, again, it seems that a positive mood favours the changing of mental structures (Pimental, 2011).

Creativity is a kind of purposeful thinking which is popularly seen as involving moods and emotions. In particular, productivity in the creative arts is believed to stem, at least partly, from a desire to express or purge some emotional experience (e.g. Averill, Chon, and Hahn, 2001). In the classroom, however, Adler and Obstfeld (2007) recommend relying on the pleasant, activating, approach effect of interest to motivate students and foster creativity. Students in a positive frame of mind tend to look for the interest a task offers and, if they find none, re-interpret it in ways which supply interest (e.g. Stanko-Kaczmarek, 2012). Often, teachers set the problem or task but problem finding can also be a part of the creative process. Successfully identifying an intellectual problem can be exciting and motivating (Liggett, 1991; Ritchie, Shore, LaBanca, and Newman, 2011). What has been said about moods and emotions bearing upon the process of understanding can also apply to creative thinking. Certainly, positive moods can foster creative thought and problem solving probably because they tell students it is safe to take control, explore, experiment, even indulge themselves and make mistakes (Fredrickson, 2004; Kaufmann, 2003; Vosburg, 1998). (This is not to say that students in a mildly negative mood cannot be creative. They tend to approach the task in a different way and may produce (or express) fewer novel ideas but the students can be more persistent (Kaufmann & Vosburg, 2002).)

Focused, systematic thinking

Logical deduction is commonly seen as insensitive to moods and emotions. In mathematics, for instance, the content can be devoid of vested interests. For relatively simple tasks, this may be so and High Reason prevails. Where the task is other than algorithmic and simple, it often needs attention, interpretation and recall of prior knowledge in order to construct an appropriate representation. Emotional matters relating to attention and recall were mentioned above and apply here, too. Information (for instance, in the form of premises) tends to be interpreted in ways which are congruent with moods (Blanchette & Richards, 2010). In this way, and as with constructive thinking, what is processed in deduction and in critical thinking can vary with mood. Furthermore, a sad mood is known to promote careful, systematic reasoning. In the kinds of social reasoning expected in some disciplines, a consideration of the 'beliefs, desires, and intentions' of others is also more likely when in a sad mood (Converse, Shuhong, Keysar, and Epley, 2008: 725). Positive emotions, like happiness, can encourage a careless and disordered processing which lowers performance in step-by-step logic (e.g. Blanchette & Richards, 2010; Pham, 2007). When the topic involves vested interests, it can generate emotions which prompt defensive thinking. Students can be reluctant to set aside long-standing beliefs when logic dictates that they should (Croker & Buchanan, 2011; Sripada & Stich, 2004). To do so would be to admit error and lose face; it may also require a potentially disturbing and effortful adjustment of mental structures and behaviours. This illustrates that deduction can be sensitive to moods and emotions. In particular, success and quality of thought can be affected by the state of mind taken to the task and acceptance of conclusions by their implications for vested interests.

Usually very highly valued, critical thinking is also open to the effects of moods and emotions (Wade, 1995). For instance, negative moods can produce a tendency to be excessively critical (e.g. Efklides & Petkaki, 2005). There are also unconscious biases stemming from vested interests. These trigger the emotional system to favour an outcome which supports personal needs, values and goals: what makes the critical thinker feel mentally comfortable makes the mind less open than some would like to believe (Newton, 2014a). This biasing towards self-interest makes emotion look bad for critical thinking but, given that analysis is an important part of it, it benefits from a touch of sadness in what Andrews and Thomson (2009, p. 620) describe as ‘analytical rumination’. This, however, can lead to a tension between some kinds of purposeful thought in which critical thinking is embedded to ensure its quality. Creative thinking, and the generation of ideas in particular, can benefit from a positive frame of mind. The critical evaluation of those ideas is better done cold. The two kinds of purposeful thought are at their best under different conditions and an over-assiduous application of critical thinking can terminate the generation of ideas.

Decision making

Values – beliefs which lead us to favour certain behaviours and outcomes – determine what is perceived to be good or bad and can underpin a desire for a particular state of affairs. As Hume (1739/1978) so clearly saw, the intellect is used to achieve what we value and, therefore, see as good. Conversely, the passions pass comment on the intellect’s proposals so that what seems like a logical decision (e.g. accepting employment in a distant town in a prestigious company rather than staying in a backwater) may not feel right. The conflict between the two systems often reflects the intellect’s disregard of personal values so that what is logical may not promote personal well-being (Sylvester, 1994). When the ends have consequences for others, moral judgments about what is right and wrong are needed. Kant (1785/2002) argued that this was a matter for the intellect but psychologists find that, in practice, it is more a matter for the emotional system which presents its findings as valenced emotions which answer, ‘How do I feel about it?’ (e.g. Haidt, 2002). The process is quick and can handle complex situations. Here, in favouring outcomes with personal value, the emotional system reduces infinite possibilities to a manageable few (Haselton & Ketelaar, 2006). This is not to say that its prompts are always faultless: they are only as good as the person’s values. Emotions can also bias decisions; Schnall (2011) has demonstrated that, for instance, feelings of disgust makes judgments in general more severe.

Broad speaking, constructive thought can benefit from moderately positive moods while focused, systematic thought benefits from moderately negative moods. In decision making, where matters of personal consequence are involved, the emotional system can be an essential part of it. Reality is, of course, rarely so simple; emotion-cognition interaction can be complex but this serves to illustrate it is not necessarily bad for thought, provided that the moods and emotions are the ‘right’ ones. There is, however, also some truth in the popular belief that they can impede purposeful thought, particularly when moods and emotions are strong and when public performance is involved.

Fraught thought

It is common knowledge that strong emotions, like anger and euphoria, take mental resources from the task in hand (Pham, 2007; Stollstorff, Bean, Anderson, Devaney,

and Vaidya, 2013). Similarly, strong moods, like depression, can generate protracted rumination about past events which displace thought about current matters (e.g. Smallwood, Fitzgerald, Lynden, and Phillips, 2009). Emotions are also produced in threatening classroom situations. Responding to a teacher's questions and contributing in group work can be sufficiently disturbing to generate a disabling anxiety or embarrassment which adversely affects performance (Rank & Frese, 2008). Oral work in modern foreign language teaching can produce emotional responses – something like stage fright – which are a significant barrier to learning (Horwitz, 2010). Krashen (1988) noted that such negative emotions (which he called affective filters) can be strongly disabling. Tests and examinations can also generate disabling anxieties which increase with age and reduce students' attainment, making some students drop out of school (Connors, Putwain, Woods, and Nicholson, 2009; Segool, Carlson, Gosforth, Embse, and Barterian, 2013). The student's self and public image and aspirations are threatened by such tests but the student's responses are not inherently irrational. The emotional system is responding to perceived threats to values, beliefs and goals; where that response is moderate, it can keep a student alert and attentive but strong responses can overwhelm the intellect.

Conclusion

It is easy ignore an elephant in the classroom and be seduced by novel ephemera (Newton, 2014b). But thought is directed and shaped by fundamental forces of human nature which are ever present. When fostering or studying students' thinking, it is important to recognize that the intellect is not everything, nor are emotions simply impediments to thought. The examples of purposeful thought described here are complex and often extend over time and are subject to a stream of affect. They can involve other kinds of purposeful thought which generate tensions between optimal thinking conditions and prevailing feelings. Nor can it be assumed that critical thinking will routinely correct deficient thinking: it is hard to be open-minded and impartial when matters of personal concern are at stake.

Teachers need to be able to negotiate the emotion-cognition space so that the classroom's emotional climate is conducive to productive thought. Given that emotions can determine educational outcomes, teacher training needs to recognize that teaching and learning is emotional labour, both for the student and the teacher. Teachers, often unconsciously, sense the state of mind of their students and the prevailing emotional climate but, at best, they deal with them unprepared. Teacher trainers should encourage forethought about emotion-cognition interaction in lesson planning. Those who would foster purposeful thinking also need to be aware that strategies used to activate thinking processes can themselves generate moods and emotions with the potential to affect, even nullify, that thinking. For example, it is not uncommon for teachers to have students collaborate in problem solving. Swain (2013) had students work together in pairs on a task in a second language which generated a sequence of small problems. These young students shared pride, pleasure, admiration, excitement and satisfaction as they explored possible solutions together. In the process, the stream of positive affect probably helped to make their thoughts productive. On the other hand, it is very common for teachers to try to initiate particular kinds of thought using questions. When this calls for a public response, it can generate a crippling anxiety in some students.

Those who would study purposeful thinking need to consider the extent to which moods and emotions could bear upon their investigations and whether affective variables should be controlled or reported. There is also a need for research on how to achieve a productive emotion-cognition partnership in learning environments. Strategies for handling the affective environment in a classroom would also be useful as ways of managing emotions in the laboratory are not always acceptable elsewhere.

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